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Cornell agricultural engineers design do-it-yourself vertical patternators

By Elizabeth Keller

Geneva, N.Y.: Pesticides are still a necessary and valuable tool for combating pests and diseases. But too much pesticide use contaminates runoff and watersheds and poses a health risk to workers, farm neighbors and consumers. Cornell agricultural engineer Andrew Landers and visiting scientist Emilio Gil, a professor of agricultural engineering at Catalu a Polytechnical University in Barcelona, Spain, have come up with something to help.

Working together, they designed two low-cost vertical patternators. Patternators are devices that quantify the accuracy of pesticide sprayers. With the information derived from patternators, growers can adjust the nozzles on their sprayers to improve the amount of pesticide that gets deposited on the plant canopy, thereby reducing overspray and drift. More efficient spraying also reduces the amount of pesticide needed, and therefore its cost to growers.

The Cornell vertical patternators designed by Landers and Gil are nine to 14 feet tall. They work by catching the pesticide spray at various heights along the length of their span. The intercepted spray then runs through tubes and into collection bottles that correspond to the height at which the spray was collected. The amount of spray in each bottle tells the grower exactly where the spray is aimed. The grower then uses the information to determine how much spray is being deposited into the canopy by comparing canopy height to the percentage of pesticide collected by the patternator at that height. The grower can also determine the spray pattern-if the sprayer, for example, is depositing most of the pesticide too far down on the left or too far up on the right.

Finally, the results show the percentage of pesticide going over the canopy. "Spraying over the canopy is the chief cause of drift, the clouds of pesticide that ultimately settle on soil and farm equipment and can also land on neighboring properties and sensitive crops," Landers said. "The goal is to use the information from the vertical patternators to adjust the sprayer nozzle, so that most of the spray goes into the canopy, thus reducing drift."

The Cornell patternators are made from everyday items that are readily available at any hardware store: window screens, 2x4s, nuts and bolts, elbow PVC joints, hosing, hooks and funnels. Growers can build the devices themselves for \$400 to \$700, and use them to learn how well, or how poorly, their sprayers are working. They can then translate the data into savings for both the environment and their wallets. One grower who built his own patternator based on the Cornell designs was able to save \$8000 over the growing season because he used the data to help him spray more efficiently and effectively.

Growers can obtain diagrams and supply lists for the patternators at no cost. Go to: <http://www.nysaes.cornell.edu/ent/faculty/landers/pestapp>.

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The Cornell patternator

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